

## REMARKS

The Examiner is thanked for his Office Action. Claims 1-7 and 22 are pending. Claim 1 has been amended to more clearly define the invention, as has Claim 22. Reconsideration in view of the following remarks is respectfully requested.

### I. 35 U.S.C. § 112, Second Paragraph

The Office Action rejects claims 1-7 and 22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to the rejection, the Office Action states:

Re base claims 1 and 22, no library (cell) structure (shelves, walls, etc.) has been set forth; moreover, no motive means to move the arms, hands, etc. (claim 1) or robot (claim 22) has been set forth; also re claim 22, no means has been set forth to mount the robot units and re base claims 1 and 22, it is not understood what function occurs during the manipulation of the storage units. Re claim 4, it is not understood what line 2 structurally refers to. Re claim 22, line 6, no antecedent basis exists for “the polygonal array of cells.”

The standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope. *In re Warmerdam*, 33 F.3d 1354, 1361, 31 U.S.P.Q.2d 1754, 1759 (Fed. Cir. 1994).

Whether the claim leaves unclear the manner in which a feature may be implemented is irrelevant where the claim clearly covers all forms of implementation. *In re Warmerdam*, 33 F.3d 1354, 1361, 31 U.S.P.Q.2d 1754, 1759 (Fed. Cir. 1994).

Determining whether a claim is indefinite requires an analysis of whether one skilled in the art would understand the bounds of the claim when read in light of the specification. *Credle v. Bond*, 25 F.3d 1566, 1576, 30 U.S.P.Q.2d 1911, (Fed. Cir. 1994).

The claim is not indefinite if one skilled in the art would have no particular difficulty in determining whether a feature has been implemented. *In re Warmerdam*, 33 F.3d 1354, 1361, 31 U.S.P.Q.2d 1754, 1759 (Fed. Cir. 1994).

It is not the role of the claims to teach one skilled in the art to reproduce the invention, but rather to define the legal metes and bounds of the invention. *In re Rainer*, 305 F.2d 505, 509, 134 U.S.P.Q. 343, 346 (C.C.P.A. 1962). If the metes and bounds of the claimed invention are clearly ascertainable, then the claim cannot be properly rejected as "vague" or "indefinite" under 35 U.S.C. § 112, second paragraph.

Claim 1, as amended, is reproduced below:

1. An apparatus for manipulating storage units in a library, the apparatus comprising:

a first center column having a first arm with first and second ends wherein the first end of said first arm is attached to said first center column and said first arm extends substantially radially outward from said first center column;

a first hand attached to the second end of said first arm for manipulating storage units from the library;

a second center column having a second arm with first and second ends wherein the first end of the second arm is attached to the second center column and said second arm extends substantially radially outward from said second center column; and

a second hand attached to the second end of said second arm for manipulating storage units from the library; wherein

said first arm and said second arm rotate about a same vertical axis of rotation; and

each arm and hand is independently moveable from the other arm and hand.

In the case of Claims 1 and 22, an example of a library structure is set out in the specification. See, for example, the background which states:

An automatic storage library is a system used for handling large amounts of information in a data processing system. These types of systems store and manage large numbers of standardized cassettes containing magnetic tape on which data is recorded. Typically, an automated cartridge library is comprised of arrays of uniquely identified cells in which each cell contains a single tape cartridge. These cells are arranged in arrays or racks for holding many of these cartridges.

[Specification, p.1, ll.22-30.]

This passage clearly shows what may be included in a "library" as claimed, and would certainly inform one of ordinary skill in the art of media libraries what can be included in the claim language "library."

The language of Claim 1, above, makes the legal bounds of that claim clear. It is irrelevant where the storage units are located, whether they are stored in cells as exemplified in the application, or if they are held in place by some as yet unforetold technology such as magnetic levitation. The language of the claims, interpreted in light of the specification, need only be definite enough so that one of ordinary skill in the art can ascertain the bounds of the claim. Adding limitations such as the specific means of holding storage cassettes in place, the specific means of moving the robot, or the specific function that occurs during manipulation of the storage units, does not make the legal bounds more definite, it only narrows those legal bounds. It is respectfully asserted that this narrowing of the legal bounds is not necessary for definiteness of the claims.

In construing the meaning of a claim limitation, it is entirely proper to look to the specification in order to interpret what the inventor intended by the claim term. *In re Sneed*, 710 F2d. 1544, 1548, 218 U.S.P.Q. 385, 388 (Fed. Cir. 1983) ("It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification, . . . , and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art."); *In re Marosi*, 710 F.2d 799, 802-03, 218 U.S.P.Q. 289, 292 (Fed. Cir. 1983) ("It is well established that 'claims are not to be read in a vacuum, and limitations therein are to be read in light of the specification . . .'"); *In re Ehrreich*, 590 F.2d 902, 907, 200 U.S.P.Q. 504, 508 (CCPA 1979).

Regarding the rejection based on the motive means for the hands, arms, and robot, this too is set forth in the specification.

Each LSM 108 provides the necessary mechanism for automated cartridge handling. It not only provides the storage area for magnetic tape cartridges utilized in the system, but also includes an optical system for identifying the correct cartridge, a servo-controlled, electromechanical means of selecting the proper cartridge and delivering it to the correct tape drive, and a suitable housing to ensure operator safety and data security.

[Application, p. 7, ll. 5-14; emphasis added.]

Collision avoidance is provided by software control, such as robotic control system 600 described below, which controls and monitors activities of robot 410 and robot 450 and will limit travel of robot 410 and 450 to a location just short of the mechanical stops.

[Application, p. 8, ll. 18-23.]

These passages provide enough detail about the language used in the claims that one of ordinary skill in the art would not be confused as to the scope of the claims in question. Robotic pickers themselves are not novel in the field of media storage, and the claim language referring to the various parts of the robot are not indefinite when read in light of the specification. The application is not intending to claim that, for example, the collision avoidance system itself is novel, so such limitations are not included in the claims and are not necessary for the claims to definitely and unambiguously define the invention.

It is noted that the examples mentioned from the specification are not limiting examples, but only provide one way to practice the invention.

Regarding the lack of a mounting means specified in the claims, various mounting means by themselves are known by those of skill in the art, and need not be included in the claim language in order to adequately describe the legal bounds of the invention. Since the innovations of the present application do not reside in the specific way that the robot and arms are attached, and since any known means to attach them are practicable under the invention, to include a specific mounting means in the claim would unnecessarily limit the scope of the claims. It is intended, consistent with the specification, that any mounting means can be used with the present invention.

Regarding what function occurs during manipulation of the storage units, this too is not necessary to specify in order to make the claims definite under the patent laws. The claims state that storage units are manipulated from the library. One of ordinary skill in the art would not need to know the intended function beyond the stated claim language of "manipulating storage units." Also, the intended function of managing a data storage

library is clearly ascertainable from the specification, and the claims are to be read and interpreted in light of the specification.

Regarding Claim 4, the phrase "substantially cylindrically symmetric" is used to describe the case where the two columns are symmetric as two cylinders sharing an axis. The term "substantially" is intended to provide minor leeway in the alignment of the columns so that minor adjustments to the design by infringers are not rewarded. "Words such as 'substantially,' 'approximately,' and 'about,' are often used in claims to prevent a potential infringer from avoiding literal infringement simply by making a minor modification. While the modifier 'substantially' certainly does broaden the term 'aligned' to some degree, it 'cannot be allowed to negate the meaning of the word it modifies.'" *Mentor Corp. v. Cox-Uphoff Corp.*, 15 U.S.P.Q.2d 1159 (Fed. Cir. 1989). It is therefore believed that Claim 4 is definite under 35 USC 112, second paragraph.

Regarding Claim 22, line 6, this claim has been amended and the rejection under 35 USC 112 second paragraph is now believed moot.

## II. 35 U.S.C. § 103, Obviousness

The Office Action rejects claims 1-7 and 22 under 35 U.S.C. § 103(a) as unpatentable over Cheatham et al (,569-cited by Applicants) in view of Sander (,293) or Mason (,088).

With regard to the rejection, the Office Action states:

Cheatham et al disclose in at least figure 1, an unnumbered center column (floor mounted) along axis 30, opposed first and second arms 28 rotatable along the column, raisable/lowerable hands 12a and 12b, etc. mounted on the arms and cellular library 44, etc., but do not disclose independently movable hands and arms which is disclosed by Sander (28, 30, etc.) Mason (18, 20, 36, 101, etc.) and in view of the same, it would have been obvious to have substituted separate rotatable arm mountings to increase the flexibility of the apparatus as taught by either secondary reference. Re claim 2, it would have been obvious to have substituted conventional equivalent ceiling mountings of the first column, if desired, as this would have been known warehouse mountings of manipulators. Re claim 3, Mason (18, 19, 36, 37, etc.) teaches and renders obvious the utilization of longitudinally movable hands along arms. Re claim 5, Sander (46, 22, etc.) teaches the obvious desirability of mounting a column within a column, if desired.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese Patent (,505).

**A. The references may not properly be combined because Sander and Mason are from non-analogous fields and are directed to entirely different problems than the present invention.**

In order to rely on a reference as a basis for rejection, the reference must be either in the applicant's field of endeavor or, if not, then reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 24 U.S.P.Q.2d 1443, 1445 (Fed. Cir. 1992); *In re Deminski*, 796 F.2d 436, 442, 230 U.S.P.Q. 313, 315 (Fed. Cir. 1986).

Cheatham et al. deals with electronic media storage and retrieval. However, the other two references mentioned by the Examiner in the obviousness rejection are clearly outside the applicant's field of endeavor. They also address entirely different problems than those addressed by the inventors of the current application, as discussed below.

Sander teaches a design for a cutting disk assembly, used for cutting coiled metal strips into ribbons. The problem addressed by this invention is how to change equipment (cutting assemblies) on the cutter, where only one cutting assembly is used at a time, avoiding the downtime while this equipment is changed. [See Sander, col.1, ll.44-72.] This problem is not the problem addressed by the inventor of the present application, which is directed at maximizing the access speed and storage volume of a media library and has nothing to do with changing equipment.

The Sander reference proposes a cutting device with two arms, one to hold the actively used cutting assembly, the second arm to hold a spare cutting assembly which is not in use while the first assembly is in use. [See col.4, ll.6-28.] The two arms do not appear to move by any means except by the operator manually moving them, in contrast to the inventions of the present application. The spare arm is intended to be a staging location to prepare a second cutting assembly, so that when new equipment is necessary, the second assembly can be immediately moved in to replace the first assembly, without the time necessary to remove that assembly from that arm and replace it with another assembly on that same arm. [See col.4, ll.6-28.] By adding a second arm, the second

cutting assembly can be pre-loaded and moved into action immediately after the first arm is out of the way. This directly reduces the downtime when equipment is changed.

This problem is unrelated to that of the present application, which is aimed at storing and retrieving media elements in a data storage library. Not only are the problems between the Sander reference and the present application different (i.e., reducing downtime while changing equipment in Sander versus maximizing access speed and storage density in the present application), but the solutions to those problems are different and unrelated. Sander provides the human operator with a staging area (the second arm) on which to pre-load a new cutting assembly, then to switch between first and second arms. In the present application, the solution is to add a whole new functioning robot controlled access arm, doubling the number of arms in use within the storage library. Neither of the two arms in the present application is analogous role to the added arm in Sander, which is only used to prepare for a change of equipment and which does not perform any cutting in this capacity. Likewise, the arms in the present application do not directly substitute for one another, but instead both are employed serially or simultaneously without the need for a human operator to switch between them.

In short, the solution in Sander is to provide an extra set of identical equipment (a second cutter loading arm), then alternate between their use to perform an identical task. This solution would not be beneficial if employed in the present application and is not part of the solution offered by the current application. The solution in the present application is to add a second and fully functioning robotic manipulator to be in full use with the first such manipulator, and not intended to replace that first manipulator.

Therefore, one of ordinary skill in the art of data storage libraries would not have been motivated to look to Sander for a solution to storage density needs because Sander is outside the field of endeavor of the present application and is not pertinent to the problem addressed by the present application.

Likewise, the Mason reference is outside the field of endeavor of the present application and is not reasonably pertinent to the particular problem addressed by the present application.

Mason is in the field of submersible chambers for doing underwater work at an underwater work site, and not the field of media library data storage. The Mason

reference is directed to the problem of providing multiple and different tools for use at the underwater work site without the need to resurface the chamber to change tools manually. [See Abstract.] Mason provides multiple tools for use at the work site by adding multiple arms to the submersible chamber, each of which can contain one or more tools. [See, e.g., Figure 1.] The multiple arms allow the surface operators to alter their use of tools without needing to resurface the chamber.

This problem is not related to those addressed in the present application, which deals with limited storage space of media elements within a media library, and how to efficiently access such media elements with robotic manipulators. Access to a plurality of different tools (the motivation for the innovation in Mason) is unrelated to the problems of the present application and would not aid in media storage access and retrieval.

Also, the limitations which are overcome by Mason are inherently imposed by the need to apply multiple different tools at the underwater work site. If only one tool were needed at the underwater work site, then the innovations of Mason would be unneeded. This fact is supported by the following passage:

Such prior art work arms while serving their intended functions were limited insofar as the chamber had to be returned to the surface to change tools. This was particularly undesirable where the chamber was operating at an undersea station at depths of several hundred feet or more.

Mason, col. 1, ll. 20-25.

Therefore, one of ordinary skill in the art of data storage libraries would not have been motivated to look to Mason for a solution to storage density needs because Mason is outside the field of endeavor of the present application and is not pertinent to the problem addressed by the present application.

The disparity of the fields and problems addressed between the cited references and the current application is demonstrated further by contrasting the references themselves. Both Mason and Sander are themselves unrelated to each other. Sander is in the field of metal cutting instruments, and is directed at the problem of wasted downtime

between the use of a first cutter assembly and the use of a second cutter assembly. It solves this problem by adding a spare arm which is alternately in use with the first arm.

Mason, however, is in the field of underwater tool use. It addresses the problem of providing multiple tool use for an underwater device without the need to bring the device itself to the surface. It solves its problem by adding a second arm that can be used with the first arm. The second arm does not, as in Sander, replace the first arm, but instead works with it and provides added options for the human operator on the surface. The problem of Mason would not prompt one to look to Sander for a solution, nor would the problem of Sander prompt one to look to Mason for a solution, because these two references are from different fields and address different problems.

If the applicant has overlooked a relevant teaching, it is respectfully requested that the Examiner point out such teachings with particularity.

**B. The references cited may not properly be combined in the proposed manner.**

A prior art reference is analogous, and may be combined with other references to establish a *prima facie* case of obviousness, only if: (1) it falls within the same field of endeavor as the claimed invention; or (2) although from a different field of endeavor, it is reasonably pertinent to the particular problem which the inventor was addressing. *In re Clay*, 966 F.2d 656, 658-69, 23 U.S.P.Q.2d 1058, 1060 (Fed. Cir. 1992).

As argued above, it is respectfully asserted that the Sander and Mason references cited in the most recent office action are not within the same field of endeavor as the present application, and likewise neither of these references are reasonably pertinent to the particular problem addressed by the present application, which is to increase efficiency of storage and access of media elements in a media storage library. Therefore, applicant argues that these references may not properly be combined with the Cheatham et al. reference.

Similarly, the proposed references may not be properly combined because there is no suggestion, reason, or motivation found in the prior art that suggests the benefits of such a combination. The combination of elements from nonanalogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness. There must be some reason, suggestion, or

motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself. *In re Oetiker*, 977 F.2d 1443, 24 U.S.P.Q.2d 1443, 1446 (Fed. Cir. 1992).

If the applicant has overlooked a relevant teaching, it is respectfully requested that the Examiner point out such teachings with particularity.

**C. There is no motive or incentive to combine the references in the proposed manner.**

A proper *prima facie* case of obviousness cannot be established by combining the teachings of the prior art absent some teaching, incentive, or suggestion supporting the combination. *In re Napier*, 55 F.3d 610, 613, 34 U.S.P.Q.2.d 1782, 1784 (Fed.Cir. 1995); *In re Bond*, 910 F.2.d 831, 834, 15 U.S.P.Q.2.d 1566, 1568 (Fed.Cir. 1990). In the most recent office action, the Examiner states that

it would have been obvious to have substituted separate rotatable arm mountings to increase the flexibility of the apparatus as taught by either secondary reference.

The applicant does not see such motivation taught or suggested in the cited prior art references. If the applicant has overlooked a relevant teaching, it is respectfully requested that the Examiner point out with particularity any teachings that teach or suggest such a motivation to one of ordinary skill in the art. Absent some teaching or suggestion in the references, it is respectfully asserted that the proposed combination of references is improper.

**D. The references, even if properly combined, do not teach all the limitations of the present invention.**

With respect to at least Claim 22, the cited references do not teach all limitations of the present invention.

The Cheatham et al. reference appears to show a robotic data storage system that has a pair of vertical arms rigidly attached to and balanced at either end of a single horizontal arm. The entire apparatus rotates about a point in the center of the horizontal arm. [See, e.g., Cheatham et al., Fig. 1.] Cheatham et al. does not appear to teach first

and second robot units within the array to manipulate cells, as claimed in at least Claim 22 of the present application.

The Sander reference appears to teach a transfer device for cutting disk assemblies of a slitter which cuts metal disks into ribbons. The transfer device has two arms which appear to rotate about a single axis, and are intended to be used such that while one arm is employed feeding a cutting disk into the assembly, the other arm is extended away from the assembly so an operator can assemble a different set of cutting disks for a different job, saving the down time that would occur if only one arm were used and a cutting assembly had to be replaced. [See Sander, col.1, ll.44-72.] Sander does not appear to teach two or more robot units of any kind, as claimed in at least Claim 22 of the present application.

The Mason reference appears to show a submersible chamber having arms attached to it, with tools attached to the ends of the arms for underwater work. The arms appear to be extensible and rotatable so as to provide a choice to tools for work at an underwater station. [See Mason, Abstract; col.2, ll.1-15.] Mason does not appear to teach two or more robot units of any kind, as claimed in at least Claim 22 of the present application

Claim 22 of the present application, recites in part:

“a first robot unit, wherein the first robot unit transports a data storage unit to and from the array of cells;

a second robot unit, located within the array of cells, wherein the second robot unit, independently with respect to the first robot unit, manipulates data storage units placed in the array of cells.”

[Claim 22, present application.]

Therefore, it is respectfully requested that the rejection of all the pending claims under 35 USC 103 be reconsidered and that the claims be allowed.

With regard to the rejection, the Office Action states:

The Japanese Patent discloses independently movable robots 31A and 31B accessing storage units 10 in cells 2, etc. It would have been obvious to have

substituted the handling of equivalent storage units, such as data storage units, if desired.

It is respectfully asserted that the figures of the cited Japanese reference show two separate and independent storage areas for panels. Each of these separate storage areas appears to be serviced by an individual robot. There is no indication in the reference that the robots *both* service the same storage area. In fact, the robots themselves are shown in the application with reference numbers 31A and 31B, which correspond to individual storage areas 2A and 2B, respectively. These letter suffixes are consistently used in the drawing, the “A” suffix consistently referring to the right hand storage area and its parts, the “B” suffix consistently referring to the left hand storage area and its parts. Hence, it is the only reasonable interpretation that the robot labeled 31B is intended to service storage area 2B, while the robot labeled 31A is intended to service storage area 2A.

Furthermore, the English language summary of the patent itself does not appear to be consistent with the Examiner’s assertion that this reference teaches both robots accessing storage units 10 in cells 2. The summary states:

A panel storage shelf 2 is formed into a circular arc shape with one end located near the end section of a panel conveyor 1, and a panel shifting robot 3 is arranged at the center of the circular arc of the panel storage shelf 2.

[Japanese reference (‘505), English Language Summary, ll. 4-7; emphasis added.]

This passage and the corresponding figure from the reference suggest two things. First, the panel shelf and robot are both referred to in the singular form, and no mention is made of a second robot performing the same task in the same storage area as the first robot. Second, the figure clearly shows two separate storage areas, each with one robot positioned as stated in this passage. So from both the text and the figures, the Japanese reference shows only one robot per storage area. No mention is found anywhere in that reference for two robots servicing the same storage area, as claimed in Claim 22 of the present application. It is therefore respectfully asserted that the Japanese reference does not, even when combined with the Cheatham et al. reference, make Claim 22 obvious.

If the applicant has overlooked a relevant teaching, it is respectfully requested that the Examiner point out such teaching with particularity.

**III. Conclusion**

It is respectfully urged that the rejections have been overcome and that the claimed subject matter is patentable over Cheatham et al (,569-cited by Applicants) in view of Sander (,293) or Mason (,088) and is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: 1. 22 - 02

Respectfully submitted,



Patrick C.R. Holmes  
Reg. No. 46,380  
Carstens, Yee & Cahoon, LLP  
P.O. Box 802334  
Dallas, TX 75380  
(972) 367-2001  
Attorney for Applicant